THE INTERNATIONAL MAGAZINE OF METHODS FOR ENGINEERING/OPERATING PEOPLE

# Petroleum Engineer® INTERNATIONAL

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# U.S. Rotary Rig Count Passes 2,500 Mark

U.S. drillers in mid-November reached the 2,500 level for the first time since last January 24, as the year-long average for the year inched toward the 2,200 mark. As of November 14, the average U.S. rig count for 1983 stood at 2,167. The Canadian average was 189.

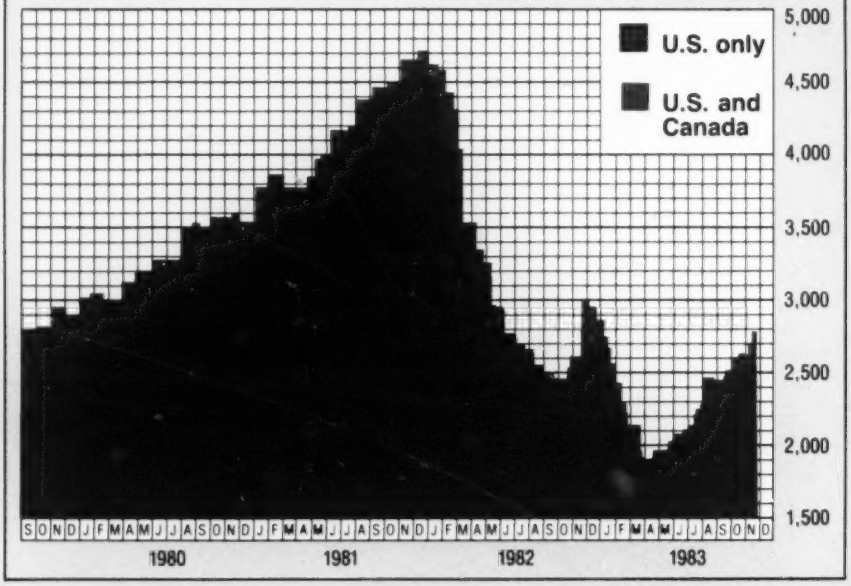
The Independent Petroleum Association of America's Cost Study Committee said last month that only 48% of U.S. rigs are being utilized, and that a large number of the idle rigs are located in major gas drilling areas. Oklahoma, southern Louisiana, and the southwestern states have 1,060 idle rigs, or nearly 39% of all U.S. idle equipment.

Approximately 5,270 rigs currently are available in the U.S., but the Cost Study Committee expects next year's rig fleet to be down by 400 to 500 rigs, or to approximately 4,800. At that time, rig utilization is projected to reach 64.6%.

## Rotary rigs actually making hole in United States & Canada

As Reported To International Association Of Drilling Contractors By Hughes Tool Co.

| | Oct. 24, 1983 | Oct. 31, 1983 | Nov. 7, 1983 | Nov. 14, 1983 |
|---|---|---|---|---|
| Alabama | | | | |
| Land | 18 | 17 | 19 | 15 |
| Inland Waters | 1 | 1 | 1 | 1 |
| Offshore | 1 | 1 | 1 | 1 |
| Alaska | | | | |
| Land | 6 | 6 | 6 | 8 |
| Offshore | 2 | 2 | 2 | 5 |
| Total | 8 | 8 | 8 | 13 |
| Arkansas | 30 | 25 | 25 | 24 |
| California | | | | |
| Land | 90 | 97 | 97 | 88 |
| Offshore | 18 | 18 | 18 | 19 |
| Total | 108 | 115 | 115 | 107 |
| Colorado | 68 | 69 | 69 | 60 |
| Florida | | | | |
| Land | 2 | 3 | 3 | 3 |
| Offshore | 1 | 1 | 1 | 1 |
| Total | 3 | 4 | 4 | 3 |
| Georgia | 1 | 1 | 1 | 1 |
| Idaho | 3 | 3 | 3 | 2 |
| Illinois | 66 | 61 | 70 | 70 |
| Indiana | 7 | 5 | 6 | 6 |
| Kansas | 142 | 143 | 147 | 150 |
| Kentucky | 10 | 10 | 9 | 9 |
| North Louisiana | 33 | 31 | 30 | 31 |
| South Louisiana | | | | |
| Inland Waters | 51 | 48 | 50 | 43 |
| Land | 77 | 84 | 93 | 96 |
| Offshore | 113 | 117 | 126 | 135 |
| Total | 274 | 280 | 299 | 305 |
| Michigan | 33 | 38 | 37 | 39 |
| Mississippi | 39 | 37 | 37 | 42 |
| Montana | 35 | 32 | 35 | 36 |
| Nebraska | 6 | 7 | 7 | 5 |
| Nevada | 1 | 1 | 1 | 1 |
| New Jersey | 1 | 1 | 1 | 1 |
| New Mexico | 80 | 72 | 80 | 86 |
| New York | 13 | 14 | 16 | 16 |
| North Dakota | 57 | 64 | 62 | 62 |
| Ohio | 44 | 46 | 46 | 46 |
| Oklahoma | 250 | 247 | 255 | 289 |
| Pennsylvania | 27 | 26 | 22 | 25 |
| South Dakota | 2 | 2 | 3 | 2 |
| Tennessee | 1 | 1 | 1 | 1 |
| Texas | | | | |
| Offshore | 42 | 38 | 41 | 41 |
| Inland Waters | 11 | 11 | 10 | 8 |
| Dist. 1-S. Central Tex. | 24 | 23 | 27 | 19 |
| Dist. 2-Middle Tex. Coast | 42 | 47 | 48 | 54 |
| Dist. 3-Upper Tex. Coast | 118 | 123 | 120 | 123 |
| Dist. 4-Lower Tex. Coast | 85 | 88 | 87 | 96 |
| Dist. 5-Northeast Tex. | 22 | 24 | 25 | 27 |
| Dist. 6-Far Northeast Tex. | 76 | 72 | 77 | 76 |
| Dist. 7B-N. Central Tex. | 46 | 47 | 43 | 50 |
| Dist. 7C-W. Central Tex. | 58 | 53 | 61 | 69 |
| Dist. 8-Far West Tex. | 156 | 150 | 136 | 141 |
| Dist. 8A-West Tex. | 70 | 68 | 73 | 81 |
| Dist. 9-North Tex. | 77 | 77 | 76 | 72 |
| Dist. 10-Tex. Panhandle | 59 | 58 | 54 | 61 |
| Total | 886 | 879 | 878 | 917 |
| Utah | 37 | 39 | 43 | 46 |
| Virginia | 3 | 5 | 3 | 2 |
| Washington | 1 | 1 | 1 | 1 |
| West Virginia | 42 | 34 | 37 | 38 |
| Wyoming | 120 | 120 | 130 | 134 |
| Total U.S. | 2,418 | 2,409 | 2,473 | 2,556 |
| Canada | 180 | 185 | 214 | 221 |
| Canada-Offshore | 13 | 13 | 13 | 13 |
| U.S. and Canada | 2,611 | 2,607 | 2,700 | 2,790 |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1981
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ABOUT THE COVER: The most promising area in this year's Area of Promise (the Pacific Coast) lies offshore Southern California.

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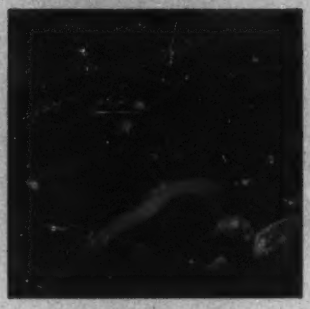

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NEXT MONTH: The annual Development Drilling issue will look at some of the more interesting drilling programs in known fields.

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# 1983 Drilling Costs Down More Than 17%

Composite drilling cost estimates by the Department of Energy's Energy Information Administration for the years 1982 and 1983 reflect the overall downward trend from 1981 in that the costs are down for all of the drilling depths considered for both years and for oil wells, gas wells, and dry holes.

The EIA estimates cover well drilling and completion costs for 13 onshore geographical areas of the U.S. by depth bracket and type of well. The depth intervals are the same as those used by the Joint Association Survey on Drilling Costs.

The most active depth bracket for onshore drilling in 1981 was 3,750 ft, which includes all wells drilled to depths between 2,500 and 4,999 ft. The projected 1983 index for this depth interval is 127.2, which is 17.5% lower than the index for costs projected for 1982 (1976 = 100). The highest projected 1983 index number is 181.4, which is projected for the 17,500-ft depth (Table 1).

Annual cost reductions for 1982 varied from 21.1% for all 2,500-ft wells to 30.6% for 17,500-ft wells. Annual decreases for 1983 vary from 8.6% for 15,000-ft wells to 17.5% for wells in the three shallowest drilling depths. And 2-year cost declines vary from 32.7% for all 15,000-ft wells to 37.6% for 7,500-ft wells.

The average cost of an onshore oil well drilled to 2,500 ft (the most active depth) during 1981 was $117,000. The 1982 projected average cost was 22.1% lower than the 1981 cost, and the 1983 cost is down another 17.5%. In the group of the most active depths in each of the 13 drilling areas, projected oil well drilling cost changes for 1982 varied from a decrease of 5.2% for 2,500-ft wells in the Northeast to a decrease of 47.9% for 10,000-ft wells in the South Louisiana area.

For gas drilling, the 5,000-ft bracket was the most active onshore depth during 1981. Average 1981 drilling cost was $255,000 per well at that depth interval, and the EIA says this cost decreased by 18.3% in 1982 and another 15.4% in 1983.

Gas-well drilling cost indexes (1976 = 100) for all depths, in all areas, for 1983 are projected to vary from a low of 75.8 (the lowest index in the EIA study) for 2,500-ft wells in the Ark-La-Tex area to a high of 218.4 for 15,000-ft gas wells in the Southeastern area. The 2-year declines in costs ranged from 3.4% for 5,000-ft wells in the Northeastern area to 61.1% (the deepest 2-year cost decline in the EIA study) for 17,500-ft wells in the South Louisiana area.

**TABLE 1. Composite of well drilling costs and indexes by depth for the inland contiguous U.S.**

| Depth, ft | 1981 index (1976 = 100) | 1982 index (1976 = 100) | 1982 Annual change, % | 1983 index (1976 = 100) | 1983 Annual change, % | 1983 Cost, $ |
|---|---|---|---|---|---|---|
| 1,250 | 198.7 | 153.2 | -22.9 | 126.4 | -17.5 | 32,000 |
| 2,500 | 192.4 | 151.8 | -21.1 | 125.2 | -17.5 | 66,000 |
| 3,750 | 200.7 | 154.1 | -23.2 | 127.2 | -17.5 | 103,000 |
| 5,000 | 217.5 | 165.6 | -23.9 | 141.7 | -14.4 | 162,000 |
| 7,500 | 242.1 | 176.5 | -27.1 | 151.1 | -14.4 | 340,000 |
| 10,000 | 257.7 | 187.8 | -27.1 | 165.2 | -12.1 | 679,000 |
| 12,500 | 252.8 | 185.4 | -26.6 | 163.0 | -12.1 | 1,221,000 |
| 15,000 | 253.8 | 186.8 | -26.4 | 170.7 | -8.6 | 2,227,000 |
| 17,500 | 286.1 | 198.6 | -30.6 | 181.4 | -8.7 | 3,649,000 |

Dry holes bottomed out at the 3,750-ft depth level most often in 1981, when the national average drilling cost for that depth was $118,000. Projected national average annual changes for that depth are -27.7% for 1982 and -14.4% for 1983.

The group of the most frequently drilled dry hole depths in each area indicates changing costs for 1982 ranging from an increase of 1.9% for 2,500-ft holes in the Northeastern area to -46.8% for 10,000-ft holes in the South Louisiana area. Additional cost changes projected for 1983 vary from a decrease of 28.1% in the Mid-Continent area to a decrease of 3.3% in the Southeast.

The 2-year drilling cost changes for all depths, in all areas of the U.S., vary from a decline of 0.6% for 3,750-ft dry holes in the Northeastern area to a decline of 55.1% for 17,500-ft dry holes in the South Louisiana area. Dry hole drilling cost indexes for 1983 are projected to vary from a low of 96.3 for 5,000-ft dry holes in the Ark-La-Tex area to a high of 250.3 (the highest 1983 index in the EIA study) for 2,500-ft holes in the Western area.

Copies of the complete study (DOE/EIA-0347[82-83]) are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

## Transierra Recompletes Liberty County Gasser

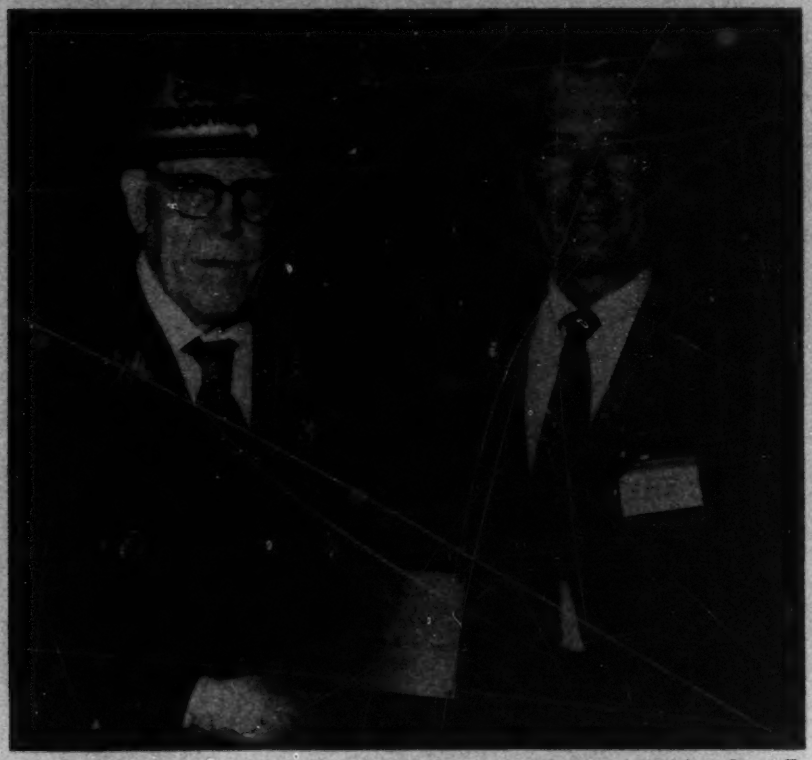
Transierra Exploration Corp. has successfully recompleted the B. E. Quinn No. 1 well in Liberty County, Texas. The well is flowing 1 MMcfd of gas from the Yequa formation at 7,050-55 ft through a 9/64-in. choke. Tubing pressure is 2,225 psi.

## Dean McGee Is Chief Roughneck

Dean A. McGee, a pioneer in the discovery and development of oil fields in Oklahoma, became the 29th prominent oil man to be honored as Chief Roughneck when he received the prestigious award during last month's annual membership luncheon of the Independent Petroleum Association of America in New Orleans.

The 1983 Chief Roughneck, who headed Kerr-McGee Corp. from 1954 until his retirement earlier this year, was presented the award (complete with plaque, hard hat, lapel pin, and a bust of the Joe Roughneck character) by James E. Chenault Jr., president and chief executive officer of Lone Star Steel Co. Lone Star Steel founded the Roughnecks' Clubs, and the Chief Roughneck Award, in the early 1950s.

*(Continued)*



Dean A. McGee (left) receives the trappings of office as Chief Roughneck 1983 from James E. Chenault Jr., president of Lone Star Steel Co. The presentation was made during last month's meeting of the Independent Petroleum Association of America in New Orleans.

McGee's career as an oil man got underway more than 50 years ago, soon after he received a BS degree in mining engineering at the University of Kansas. He served as chief geologist for Phillips Petroleum Co. for 10 years before agreeing to "temporarily serve" as executive vice president for Kerlyn Oil Co., the forerunner of Kerr-McGee Corp. That "temporary" service lasted more than 40 years.

## All Regions Participate In World Drilling Slump

The drop of more than 200 active Free World drilling rigs between September 1982 and September 1983 left no region of the world unscathed, although some were more scathed than others.

Africa, for example, accounted for a major portion of the slump with a loss of 80 active rigs. Latin America was not far behind, with a decline of 67 rigs. Europe suffered a 47-rig decline, while the Middle East was off 11. The Far East was down by 8 rigs, and the South Pacific region saw its rig count drop from 33 to 30 – a loss of 3.

Steepest decline for any one country took place in Algeria, which lost 50 rigs during the year. Argentina, on the other hand, managed to add 15 rigs to the active roster.

**International Rotary Rig Report, prepared by Hughes Tool Co.**
(Figures in parentheses indicate now many of each country's rigs are offshore rigs.)

| | Sept. 1982 | Aug. 1983 | Sept. 1983 |
|---|---|---|---|
| **Africa** | | | |
| Algeria | 90 | 40 | 40 |
| Angola | 13(9) | 10(8) | 10(8) |
| Benin | 1(1) | 1(1) | 1(1) |
| Cameroun | 7(6) | 5(5) | 5(5) |
| Chad | 1 | 0 | 0 |
| Gabon | 10(8) | 6(6) | 6(6) |
| Guinea | 1(1) | 0 | 0 |
| Ivory Coast | 4(4) | 1(1) | 1(1) |
| Libya | 28(1) | 27(2) | 27(2) |
| Morocco | 5 | 5 | 5 |
| Niger | 1 | 0 | 0 |
| Nigeria | 25(10) | 17(7) | 16(6) |
| Rep. of Congo | 5(4) | 4(4) | 4(4) |
| Rep. of Zaire | 2(1) | 2(1) | 2(1) |
| Senegal | 1 | 0 | 0 |
| Sierra Leone | 1(1) | 0 | 0 |
| South Africa | 2(2) | 2(2) | 2(2) |
| Sudan | 2 | 5(1) | 5(1) |
| Tanzania | 0 | 1 | 1 |
| Tunisia | 11(3) | 5(2) | 5(2) |
| | 210(51) | 131(40) | 130(39) |
| **Europe** | | | |
| Austria | 8 | 9 | 9 |
| Denmark | 2(2) | 5(4) | 5(4) |
| France | 14 | 19(1) | 20(1) |
| Germany | 31 | 24 | 24 |
| Greece | 4(2) | 3(1) | 3(1) |
| Holland | 23(15) | 16(10) | 15(7) |
| Ireland | 0 | 2(1) | 1(1) |
| Italy | 34(7) | 20(5) | 20(5) |
| Norway | 11(11) | 10(10) | 7(7) |
| Portugal | 1 | 1 | 1 |
| Spain | 12(5) | 8(3) | 9(3) |
| Switzerland | 1 | 0 | 0 |
| United Kingdom | 54(53) | 43(40) | 45(43) |
| Yugoslavia | 25 | 21(2) | 14(2) |
| | 220(95) | 181(78) | 173(74) |
| **Far East** | | | |
| Bangladesh | 7 | 2 | 2 |
| Brunei | 11(8) | 9(7) | 9(7) |
| Burma | 33 | 35(1) | 31(1) |
| India | 51(11) | 56(15) | 57(16) |
| Indonesia | 96(36) | 84(24) | 93(27) |
| Japan | 21(2) | 22(2) | 20(1) |
| Malaysia | 14(14) | 11(11) | 10(10) |
| Pakistan | 17 | 17 | 17 |
| Philippines | 13(3) | 8 | 7 |
| Taiwan | 2(1) | 9(1) | 5(1) |
| Thailand | 8(5) | 14(7) | 14(7) |
| | 273(80) | 267(68) | 265(70) |
| **Latin America** | | | |
| Argentina | 69(1) | 83 | 84 |
| Barbados | 1 | 1 | 1 |
| Bolivia | 10 | 8 | 8 |
| Brazil | 95(33) | 77(25) | 78(27) |
| Chile | 7(3) | 6(3) | 6(3) |
| Colombia | 19 | 18 | 13 |
| Costa Rica | 1 | 1 | 1 |
| Dominican Rep. | 1 | 0 | 0 |
| Ecuador | 5(1) | 4 | 5 |
| Guatemala | 2 | 1 | 1 |
| Mexico | 194(23) | 185(32) | 185(28) |
| Peru | 22(6) | 19(6) | 16(6) |
| Trinidad | 15(6) | 8(3) | 9(4) |
| Venezuela | 70(17) | 36(11) | 36(12) |
| | 510(90) | 447(80) | 443(80) |
| **Middle East** | | | |
| Abu Dhabi | 45(27) | 31(21) | 29(19) |
| Bahrain | 1 | 2 | 1 |
| Dubai | 3(3) | 8(6) | 8(5) |
| Egypt | 39(25) | 30(13) | 30(13) |
| Iran | 0 | 19(2) | 20(2) |
| Iraq | 5 | 25 | 18 |
| Jordan | 0 | 3 | 3 |
| Kuwait | 5 | 5 | 6 |
| Oman | 12(2) | 8 | 13 |
| Qatar | 5(2) | 4(2) | 3(2) |
| Ras Al Khaimah | 2(1) | 0 | 0 |
| Saudi Arabia | 29(12) | 29(14) | 25(13) |
| Sharjah | 3 | 1 | 0 |
| Syria | 15 | 14 | 16 |
| Turkey | 43 | 24 | 24 |
| Umm Al Qaiwain | 1 | 1 | 1 |
| | 208(72) | 204(58) | 197(54) |
| **South Pacific** | | | |
| Australia | 32(9) | 21(5) | 27(11) |
| New Zealand | 1 | 2 | 2 |
| Papua New Guinea | 0 | 2 | 1 |
| | 33(9) | 25(6) | 30(11) |
| **Totals** | 1,455 | 1,255 | 1,238 |
| | (397) | (330) | (328) |

## Gulf, Occidental Test Oman Well

Gulf Oman Petroleum Ltd. and Occidental of Oman Inc. have successfully tested their Safah-2X exploration well in the 2.4-million-acre Suneinah Block in the Sultanate of Oman.

The well flowed approximately 1,650 b/d of 30° API gravity oil through a ½-in. choke from depths of around